

CLAIMS

1. A method for combining a first material and a second material, comprising the steps of
providing a fluid which is near or in the supercritical fluid state,
5 forming a single phase solution from the first material, the second material and said fluid, and
removing said fluid from said solution in order to leave the combined first and second materials.
- 10 2. A method as claimed in claim 1, wherein the first material is at least partially dissolved in said fluid and then the second material is dissolved in said fluid.
3. A method as claimed in claim 1, wherein the second material is at least partially dissolved in said fluid and then the first material is dissolved in said fluid.
- 15 4. A method as claimed in any preceding claim, wherein the second material is provided in a semi-solid or molten state.
5. A method as claimed in any preceding claim, wherein the fluid is removed from
20 said solution by reducing the pressure in order to vent the fluid to atmosphere as a gas.
6. A method as claimed in any preceding claim, wherein the fluid is removed from said solution by suction.
- 25 7. A method as claimed in any preceding claim, wherein the fluid is carbon dioxide, water, nitrogen or any combination thereof.
8. A method as claimed in any preceding claim, wherein said solution is processed in order to produce a final product.
- 30 9. A method as claimed in claim 8, wherein the processing is extrusion or injection

moulding.

10. A method as claimed in any preceding claim, wherein the first material is a material which alters the function of the second material.

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11. A method as claimed in any preceding claim, wherein the first material comprises a mineral, a vitamin, a fullerene, a metal, a non-metal, a herb, a naturally occurring material, caffeine, an organic material, a plastics material, a monomer, an oligomer, a polymer, or any combination thereof.

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12. A method as claimed in any preceding claim, wherein a co-solvent is added to said fluid either before, after or during the formation of said single phase solution.

13. A method as claimed in claim 12, wherein the proportion of co-solvent to said fluid is about 1:20.

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14. A method as claimed in claim 12 or 13, wherein the co-solvent comprises methanol, ethanol, propanol, butyl alcohol, propylene carbonate, toluene, pentane, acetylacetone, octane, acetone or any combination thereof.

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15. A method as claimed in any preceding claim, wherein the second material comprises a polymer, a ceramic, a metal or wood.

16. Apparatus for combining a first material and a second material, including means operable to provide a fluid at a supercritical or near supercritical state, means for forming a single phase solution from a first material, a second material and said fluid, and means for removing said fluid from said solution in order to leave the combined first and second materials.

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